

AMENDMENTS TO THE CLAIMS

The following listing of the claims replaces all previous listings.

1. (Currently amended) A method of producing volume renderings from magnetic resonance image data in real time with user interactivity, the method comprising:
collecting magnetic resonance image (MRI) from a magnetic resonance coil, the MRI data representative of shapes within an image volume;
transferring the MRI data to a computer; and
producing a three-dimensional rendering of a volume from the MRI data in real time with respect to the act of collecting MRI data from a magnetic resonance coil representative of shapes within the image volume by rendering a plurality of image slices; wherein collecting MRI data, and transferring MRI data is performed continuously; and
displaying the three-dimensional volume rendering on a monitor at a rate of about 10 or more frames per second with low latency.
2. (Cancelled)
3. (Previously presented) The method of claim 2 wherein the act of producing a three-dimensional rendering from the MRI data includes rendering a plurality of two-dimensional image slices.
4. (Currently amended) The method of claim 3 wherein ~~the act of collecting MRI data from a magnetic resonance coil representative of shapes within the image volume includes executing a two-dimensional pulse sequence~~ is executed using view sharing between even and odd echoes.
5. (Previously presented) The method of claim 2 wherein the act of producing a three-dimensional rendering from the MRI data includes rendering a three-dimensional rectilinear slab.

6. (Currently amended) The method of claim 5 wherein ~~the act of collecting MRI data from a magnetic resonance coil representative of shapes within the image volume includes executing a three-dimensional pulse sequence~~ is executed using view sharing between even and odd echoes.

7. (Previously presented) The method of claim 2 wherein the act of producing a three-dimensional rendering includes:

reconstructing image data from the MRI data, the reconstructed image data being organized into sets of image slices; and displaying the reconstructed image data on a monitor to form a three-dimensional rendering.

8. (Original) The method of claim 7 wherein each image slice is formed from a set of reconstructed image data and the act of displaying the reconstructed image slices includes displaying each reconstructed image slice after all of the set of reconstructed image data is complete.

9. (Original) The method of claim 7 wherein each image slice is formed from a set of reconstructed image data and the act of displaying the reconstructed image slices includes displaying at least a portion each reconstructed image slice before the entire set of reconstructed image data is complete.

10. (Previously presented) The method of claim 2 wherein the act of producing a three-dimensional volume rendering includes:

reconstructing image data from the MRI data, the reconstructed image data being organized into a rectilinear slab; and generating a volume rendering from the rectilinear slab of reconstructed image data; and displaying the three-dimensional rendering on a monitor.

11. (Previously presented) The method of claim 10 wherein the acts of generating and displaying the three-dimensional rendering are completed after the act of reconstructing image data is complete for the entire rectilinear slab.

12. (Previously presented) The method of claim 10 wherein the acts of generating and displaying the three-dimensional rendering are completed after the act of reconstructing image data is complete for at least a portion of the rectilinear slab.

13. (Previously presented) The method of claim 2 wherein:
the act of producing a three-dimensional rendering from magnetic resonance imaging data includes the act of displaying the three-dimensional rendering on a monitor;
and
the delay (latency) between the act of collecting MRI data and the act of displaying the three-dimensional volume rendering is equal to or less than about one third of a second.

14. (Cancelled)

15. (Previously presented) The method of claim 13 wherein the act of displaying the three-dimensional volume rendering on a monitor includes the act of displaying the three-dimensional volume rendering on the monitor using alpha blending.

16. (Previously presented) The method of claim 13 wherein the act of displaying the three-dimensional volume rendering on a monitor includes the act of displaying the three-dimensional volume rendering on the monitor using maximum intensity projections.

17. (Previously presented) The method of claim 2 wherein:
the method further comprises determining the position of a cut plane through the three-dimensional volume rendering; and
the act of producing a three-dimensional volume rendering includes displaying the image data on only one side of the cut plane.

18. (Previously presented) The method of claim 2 wherein:

the act of producing a three-dimensional rendering from the MRI data includes displaying the three-dimensional volume rendering on a monitor, the displayed three-dimensional rendering having a view; and

the act of collecting MRI data from a magnetic resonance coil representative of shapes within the image volume includes scanning an image volume so that the MRI data is organized into image planes orthogonal to the view of the three-dimensional rendering displayed on the monitor.

19. (Currently amended) An apparatus for producing three-dimensional volume renderings from magnetic resonance image data in real time, the apparatus comprising:

a magnetic resonance image (MRI) scanner having a magnetic resonance coil configured to generate MRI data representative of shapes within an image volume;

a pulse sequence generator in communication with the magnetic resonance coil and configured to execute a pulse sequence using view sharing between even and odd echoes; and

a computer in data communication with the MRI scanner, the computer configured to receive the MRI data from the MRI scanner and to produce a three-dimensional rendering of a volume from a plurality of image slices from the MRI data in real time with respect to an act of collecting the MRI data from the magnetic resonance coil.